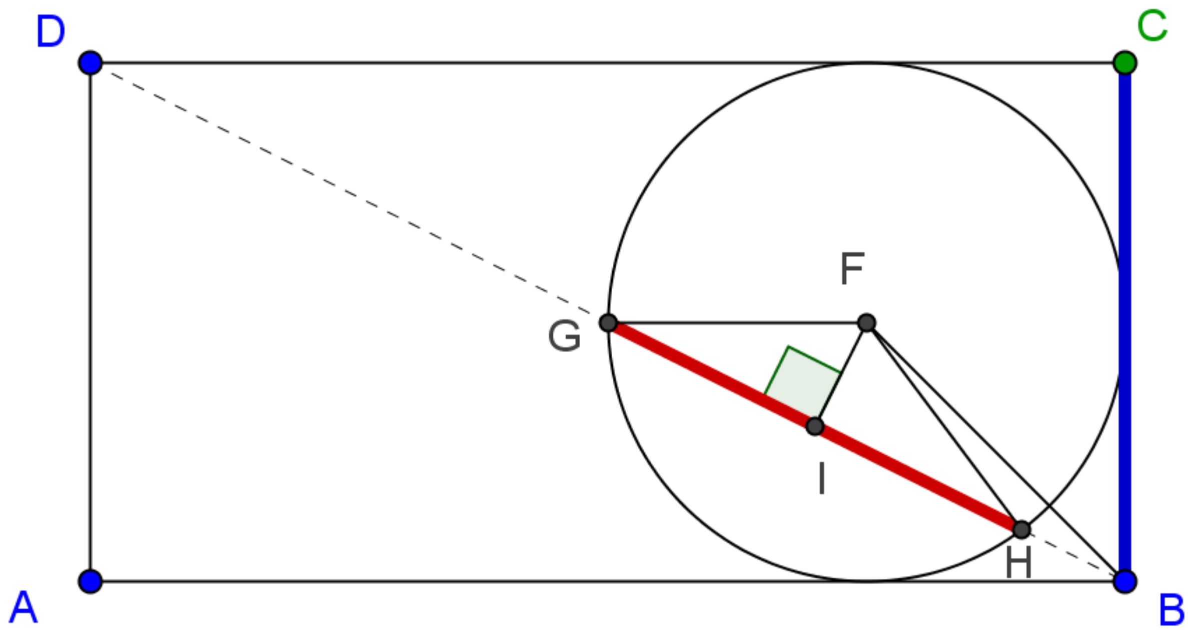

Begin by adding in the auxiliary lines FG, FH, FB and FI. Of course, triangle FGH is isosceles with FG = FH. Furthermore, since CB=x, FG = FH = $\frac{x}{2}$. Also notice that FB = $\frac{x\sqrt{2}}{2}$ (why?).

Consider right triangle FIB. Angle FBI = Angle FBA – Angle DBA = 45° - $\arctan\left(\frac{AD}{AB}\right)$ where AB is held constant and AD = x. Therefore, Angle FBI = 45° - $\arctan\left(\frac{x}{AB}\right)$. By right triangle trigonometry, FI = $FB\cdot\sin(\measuredangle FBI)=\frac{x\sqrt{2}}{2}\cdot\sin\left(45^o-\arctan\left(\frac{x}{AB}\right)\right)$.

By the Pythagorean Theorem, $GI=\sqrt{FG^2-FI^2}$, therefore,

$$GI=\sqrt{\left(\frac{x}{2}\right)^2-\left(\frac{x\sqrt{2}}{2}\cdot\sin\left(45^o-\arctan\left(\frac{x}{AB}\right)\right)\right)^2}$$

and GH = 2 GI, so

$$GH=2\cdot\sqrt{\left(\frac{x}{2}\right)^2-\left(\frac{x\sqrt{2}}{2}\cdot\sin\left(45^o-\arctan\left(\frac{x}{AB}\right)\right)\right)^2}$$